

What is claimed is:

1. An isolated polypeptide comprising an amino acid sequence selected from the group consisting of:
  - a) an amino acid sequence of SEQ ID NO:1,
  - b) a naturally-occurring amino acid sequence having at least 90% sequence identity to the sequence of SEQ ID NO:1.
  - c) a biologically-active fragment of the amino acid sequence of SEQ ID NO:1, and
  - d) an immunogenic fragment of the amino acid sequence of SEQ ID NO:1.
2. An isolated polypeptide of claim 1, having a sequence of SEQ ID NO:1.
3. An isolated polynucleotide encoding a polypeptide of claim 1.
4. An isolated polynucleotide encoding a polypeptide of claim 2.
5. An isolated polynucleotide of claim 4, having a sequence of SEQ ID NO:2.
6. A recombinant polynucleotide comprising a promoter sequence operably linked to a polynucleotide of claim 3.
7. A cell transformed with a recombinant polynucleotide of claim 6.
8. A method for producing a polypeptide of claim 1, the method comprising:
  - a) culturing a cell under conditions suitable for expression of the polypeptide, wherein said cell is transformed with a recombinant polynucleotide, and said recombinant polynucleotide comprises a promoter sequence operably linked to a polynucleotide encoding the polypeptide of claim 1, and
  - b) recovering the polypeptide so expressed.
9. A method of claim 8, wherein the polypeptide has the sequence of SEQ ID

NO:1.

10. An isolated antibody which specifically binds to a polypeptide of claim 1.

11. An isolated polynucleotide comprising a sequence selected from the group consisting of:

- a) a polynucleotide sequence of SEQ ID NO:2,
- b) a naturally-occurring polynucleotide sequence having at least 90% sequence identity to the sequence of SEQ ID NO:2,
- c) a polynucleotide sequence complementary to a),
- d) a polynucleotide sequence complementary to b) and
- e) a ribonucleotide equivalent of a)-d).

12. An isolated polynucleotide comprising at least 60 contiguous nucleic acids of claim 11.

13. A method for detecting a target polynucleotide in a sample, said target polynucleotide having a sequence of a polynucleotide of claim 11, the method comprising:

- a) hybridizing the sample with a probe comprising at least 20 contiguous nucleotides comprising a sequence complementary to said target polynucleotide in the sample, and which probe specifically hybridizes to said target polynucleotide, under conditions whereby a hybridization complex is formed between said probe and said target polynucleotide or fragments thereof, and
- b) detecting the presence or absence of said hybridization complex, and, optionally, if present, the amount thereof.

14. A method of claim 13, wherein the probe comprises at least 60 contiguous nucleotides.

15. A method for detecting a target polynucleotide in a sample, said target

polynucleotide having a sequence of a polynucleotide of claim 11, the method comprising:

- a) amplifying said target polynucleotide or fragment thereof using polymerase chain reaction amplification, and
- b) detecting the presence or absence of said amplified target polynucleotide or fragment thereof, and, optionally, if present, the amount thereof.

16. A composition comprising a polypeptide of claim 1 and an acceptable excipient.

17. A composition of claim 16, wherein the polypeptide has the sequence of SEQ ID NO:1.

18. A method for screening a compound for effectiveness as an agonist of a polypeptide of claim 1, the method comprising:

- a) exposing a sample comprising a polypeptide of claim 1 to a compound, and
- b) detecting agonist activity in the sample.

19. A method for screening a compound for effectiveness as an antagonist of a polypeptide of claim 1, the method comprising:

- a) exposing a sample comprising a polypeptide of claim 1 to a compound, and
- b) detecting antagonist activity in the sample.

20. A method for screening a compound for effectiveness in altering expression of a target polynucleotide, wherein said target polynucleotide comprises a polynucleotide sequence of claim 11, the method comprising:

- a) exposing a sample comprising the target polynucleotide to a compound, under conditions suitable for the expression of the target polynucleotide,
- b) detecting altered expression of the target polynucleotide, and
- c) comparing the expression of the target polynucleotide in the presence of varying amounts of the compound and in the absence of the compound.

21. A method for assessing toxicity of a test compound, said method comprising:
  - a) treating a biological sample containing nucleic acids with the test compound;
  - b) hybridizing the nucleic acids of the treated biological sample with a probe comprising at least 20 contiguous nucleotides of a polynucleotide of claim 11 under conditions whereby a specific hybridization complex is formed between said probe and a target polynucleotide in the biological sample, said target polynucleotide comprising a polynucleotide sequence of a polynucleotide of claim 11 or fragment thereof;
  - c) quantifying the amount of hybridization complex; and
  - d) comparing the amount of hybridization complex in the treated biological sample with the amount of hybridization complex in an untreated biological sample, wherein a difference in the amount of hybridization complex in the treated biological sample is indicative of toxicity of the test compound.

22. A polypeptide of claim 1, comprising the amino acid sequence of SEQ ID NO:1.

23. A polynucleotide of claim 11, comprising the polynucleotide sequence of SEQ ID NO:2.

24. A diagnostic test for a condition or disease associated with the expression of PDE9A in a biological sample comprising the steps of:

- a) combining the biological sample with an antibody of claim 10, under conditions suitable for the antibody to bind the polypeptide and form an antibody: polypeptide complex; and
  - b) detecting the complex, wherein the presence of the complex correlates with the presence of the polypeptide in the biological sample.
25. The antibody of claim 10, wherein the antibody is:
- (a) a chimeric antibody;

- (b) a single chain antibody;
- (c) a Fab fragment;
- (d) a F(ab')<sub>2</sub> fragment; or
- (e) a humanized antibody.

5

26. A composition comprising an antibody of claim 10 and an acceptable excipient.

27. A method of diagnosing a condition or disease associated with the expression of PDE9A in a subject, comprising administering to said subject an effective amount of the composition of claim 26.

10

28. A composition of claim 26, wherein the antibody is labeled.

29. A method of diagnosing a condition or disease associated with the expression of PDE9A in a subject, comprising administering to said subject an effective amount of the composition of claim 28.

15

30. A method of preparing a polyclonal antibody with the specificity of the antibody of claim 10 comprising:

20

- a) immunizing an animal with a polypeptide of SEQ ID NO:1 or an immunogenic fragment thereof under conditions to elicit an antibody response;
- b) isolating antibodies from said animal; and
- c) screening the isolated antibodies with the polypeptide thereby identifying a polyclonal antibody which binds specifically to a polypeptide of SEQ ID NO:1.

25

31. An antibody produced by a method of claim 30.

32. A composition comprising the antibody of claim 31 and a suitable carrier.

30

33. A method of making a monoclonal antibody with the specificity of the antibody of claim 10 comprising:

- a) immunizing an animal with a polypeptide of SEQ ID NO:1 or an immunogenic fragment thereof under conditions to elicit an antibody response;
- b) isolating antibody producing cells from the animal;
- c) fusing the antibody producing cells with immortalized cells to form monoclonal antibody-producing hybridoma cells;
- d) culturing the hybridoma cells; and
- e) isolating from the culture monoclonal antibody which binds specifically to a polypeptide of SEQ ID NO:1.

34. A monoclonal antibody produced by a method of claim 33.

35. A composition comprising the antibody of claim 34 and a suitable carrier.

36. The antibody of claim 10, wherein the antibody is produced by screening a Fab expression library.

37. The antibody of claim 10, wherein the antibody is produced by screening a recombinant immunoglobulin library.

38. A method for detecting a polypeptide of SEQ ID NO:1 in a sample comprising the steps of:

- a) incubating the antibody of claim 10 with a sample under conditions to allow specific binding of the antibody and the polypeptide; and
- b) detecting specific binding, wherein specific binding indicates the presence of a polypeptide of SEQ ID NO:1 in the sample.

39. A method of purifying a polypeptide of SEQ ID NO:1 from a sample, the method comprising:

- a) incubating the antibody of claim 10 with a sample under conditions to allow specific binding of the antibody and the polypeptide; and
- b) separating the antibody from the sample and obtaining purified polypeptide of SEQ ID NO:1.